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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,101	02/12/2001	Govinda Nallappa Rajan	2	9726

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EXAMINER	
CURS, NATHAN M	
ART UNIT	**PAPER NUMBER**
2633	

DATE MAILED: 12/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/782,101	RAJAN, GOVINDA NALLAPPA	
	Examiner	Art Unit	
	Nathan Curs	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6 and 9-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6 and 9-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 February 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagashima et al. (US Patent No. 4608682) in view of Lim et al. (US Patent No. 6026108).

Regarding claim 6, Nagashima et al. disclose an arrangement for buffering, during a finite predetermined retention time (col. 1, lines 45-53), a digital optical signal having a predetermined digital level (col. 3, lines 39-46), comprising: a semiconductor laser element with an injection current threshold of operation, below which optical loss exceeds optical gain and above which optical gain exceeds optical loss, and optical input for receiving the optical signal (figs. 3a and 3b and col. 3, lines 46-50 and col. 4, lines 14-39); and a current source connected to said semiconductor laser element and arranged to inject an injection current to said semiconductor laser element to establish an optical gain process in said semiconductor laser element (col. 4, lines 25-39 and col. 5, lines 1-18), the injection current having an amplitude at said threshold of operation such that said optical gain and said optical loss process within said semiconductor laser element are equal in order to keep said digital optical signal on said predetermined digital level (col. 4, lines 25-53). Nagashima et al. also disclose a controller connected to said current source to provide a current control signal to said current source to control an amplitude of said injection current (fig. 2, element 20 and col. 5, lines 1-18). In the laser configuration of fig. 2, Nagashima et al. are silent regarding feedback used for stabilizing

the injection current. Lim et al. disclose stabilizing the injection current of a semiconductor laser at the threshold level for balance between gain and absorption, using a feedback loop where the laser output is monitored and fed back to the drive circuitry to stabilize the injection current, in order to support the laser operation against environment variations (col. 1, line 60 to col. 2, line 10). It would have been obvious to one of ordinary skill in the art at the time of the invention to use this feedback teaching of Lim et al. for supporting the threshold injection current of Nagashima et al., to enable the laser of Nagashima et al. to resist environmental variations that could alter the injection current produced by the drive circuitry and/or the effective injection current threshold level of the laser. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the controller of Nagashima et al. to translate the laser output feedback signal taught by Lim et al. into control of the voltage source disclosed in Fig. 4 of Nagashima et al., since the voltage source is responsible for producing the injection current for the laser. Further, since the teaching of Lim et al. corresponds to supporting a threshold injection current level, it would have been obvious to one of ordinary skill in the art at the time of the invention, to further the control the voltage source based on the feedback signal only when the injection current is supposed to be maintained at the threshold (when the laser is being used in memory mode), and not when the laser is in reset mode where resetting the laser requires change the injection current level away from the threshold level (this reset action being in contradiction to maintaining an unchanging threshold level).

Regarding claim 9, Nagashima et al. disclose an optical output switch connected between an output of said semiconductor laser element and an output line, and connected to said controller to receive an output switch control signal to control outputting said optical signal to said output line (fig. 2, elements 20 and 100, and col. 3, lines 50-56).

3. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagashima et al. (US Patent No. 4608682) in view of Lim et al. (US Patent No. 6026108), as applied to claims 6 and 9 above, and further in view of Yoshida et al. (US Patent No. 6104477).

Regarding claim 10, the combination of Nagashima et al. and Lim et al. do not disclose an optical output directional filter connected between said output of said semiconductor laser element and said optical output switch. Yoshida et al. disclose a direction filter between a laser and an optical switch (fig. 1, elements 10, 17 and 18 and col. 2, lines 14-22), for suppressing downstream optical noise leaks from reaching the upstream optical source. It would have been obvious to an artisan at the time of the invention to add the directional filter disclosed by Yoshida et al., between the laser and optical output switch of Nagashima et al. to suppress optical noise leaks from reaching the laser.

Regarding claim 11, the combination of Nagashima et al. and Lim et al. disclose an optical input switch connected to said input of said semiconductor laser element (Nagashima et al.: fig. 2, element 60 and col. 3, lines 46-50), and connected to said controller to receive an input switch control signal to control inputting said optical signal to said semiconductor laser element (Nagashima et al.: fig. 2, elements 20 and 60 and col. 4, lines 62-68).

Regarding claim 12, the combination of Nagashima et al. and Lim et al. do not disclose an optical input directional filter connected between said input of said semiconductor laser element and said optical input switch. Yoshida et al. disclose a direction filter adjacent and downstream from an optical switch (fig. 1, elements 20 and 21 and col. 2, lines 29-35), for directing transmission in one direction. It would have been obvious to an artisan at the time of the invention to add the directional filter disclosed by Yoshida et al., between the input of the laser and the optical input switch of Nagashima et al. to direct transmission in one direction toward the laser.

Regarding claim 13, the combination of Nagashima et al. and Lim et al. disclose that said controller is arranged for controlling said current source such that said current source clears said semiconductor laser element by turning off said injection current during a predetermined clearing time period prior to switching said digital optical signal to said semiconductor laser element by said optical input switch (Nagashima et al.: col. 4, lines 62-68).

Response to Arguments

4. Applicant's arguments filed 28 September 2005 have been fully considered but they are not persuasive.

The applicant argues that Nagashima does not disclose, teach or suggest the following elements of claim 6: "an injection current threshold of operation below which optical loss exceeds optical gain and above which optical gain exceeds optical loss" and "the injection current having an amplitude at said threshold operation such that said optical gain and said optical loss are equal". The applicant argues that the combination does not "teach or suggest maintaining injection current at the threshold level of operation" and does not "teach or suggest maintaining injection current at the threshold level of operation so as to provide a buffering, e.g., memory, device". However the applicant has previously presented these same arguments and the examiner's previous response is already part of the record.

Regarding the applicant's argument presented in the 132 declaration, the applicant states that for Nagashima "the injection current has to be maintained at or above i.sub.b to use the bi-stable properties (hysterises) of the laser. If the current is less than i.sub.b, then the upper stable level (B) cannot be reached". However, the applicant mischaracterizes Nagashima's disclosure. Point A and point B correspond to i.sub.b in fig. 3b of Nagashima, but the exact placement of i.sub.b (and thus points A and B) is exemplary in the figure. The figure

cleary shows that i.sub.b can be any value greater than i.sub.a and less than i.sub.c to achieve bi-stable operation. Therefore, in light of this information and in light of the memory reset in Nagashima occurring by setting the current to i.sub.o, the operation of Nagashima is the same as, not converse to, the applicant's statement that "the region of injection current is maintained around i.sub.o and i.sub.c of Nagashima fig. 3b, where the gain and loss process just cancel each other out". Further, the applicant's specification does not disclose that the applicant's laser is not allowed to reach the stable upper level (of Nagashima) as argued by the applicant. Loss **outweighs** gain in the region between point D and point i.sub.c in fig. 3b of Nagashima, and no point within this region of Nagashima can possibly correspond to the applicant's claimed "threshold of operation such that said optical gain and said optical loss within said semiconductor laser element are equal".

Regarding the applicant's further arguments, presented in the 132 declaration and the remarks, that "a system according to the teaching of Nagashima et al. would be much slower to reset", the applicant's specification does not support the applicant's argument that the applicant's injection current is **close to i.sub.c but is not i.sub.b** of Nagashima. Such argument relies on Nagashima's disclosure for limiting the applicant's invention beyond the applicant's specification.

The behavior of the laser of Nagashima in the injection current region i.sub.o through i.sub.t reads directly on the limitations claimed by the applicant for the applicant's laser, as well as the applicant's laser's behavior "at the threshold value", "above the threshold value", "below the threshold value", "over a narrow electrical current range close to the threshold current value" and in the "threshold region".

Conclusion

5. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. R. Sedighian

M. R. SEDIGHIAN
PRIMARY EXAMINER